Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of

Amendment of the Commission's Rules to Facilitate the Use of Cellular Telephones and other Wireless Devices Aboard Aircraft	)	Docket No. WT 04-435

To the Commission:

Comments of Nickolaus E. Leggett

The following are formal comments from Nickolaus E. Leggett on the use of cellular telephones on airliners. I am a certified electronics technician (ISCET and NARTE), a licensed Extra Class amateur radio operator (call sign N3NL), and a licensed private pilot. I am also an inventor holding three U.S. patents.

Cellular Phone Interactions with Terrestrial Systems

As the World found out during the 9/11 terrorist events, cell phone calls can be made directly from airplanes in flight to terrestrial cell phone systems. During the terrorist events, numerous calls were placed by passengers to their loved ones.

In routine operations, cell phones operated in aircraft can both receive and send calls while the aircraft is flying. The higher the aircraft is, the more line-of-sight range the cell phone will have extending out to hundreds of miles. This situation can cause interference and an additional load on terrestrial cell phone operations. Interactions with terrestrial systems will become very important, because of the large number of cell phone calls that would be placed from flying users.

Cell phone interactions can be mitigated by having each airplane cabin operate as its own pico cell and with each cellular phone operating at very low radio frequency power output. This approach would significantly reduce interference <u>from</u> airborne cell phones to terrestrial cells. However, it would not reduce <u>incoming terrestrial interference</u> to the airborne cell operation.

A basic physical problem is that the airliner cabin is not a satisfactory shield blocking radio waves. For example, the windows of the cabin are physically large enough that they allow the cellular telephone radio waves (800 to 900 MHz) to pass through the windows. Controlling this problem would requite placing conducting metal foil over the windows or embedding a mesh of fine wire within the window. The foil or wire mesh would have to be electrically connected to the metal walls of the cabin of the airplane. Federal Aviation Administration (FAA) regulations and standards could conceivably be modified to require such shielding improvements for airliners that support cell phone usage. However, retrofitting such improvements to the large existing fleet of domestic and foreign airliners would be a major problem. In addition, the engineering of such improved shielding is a challenging project.

Potential Interference with Aircraft Electronics (Avionics)

The FAA historically has been greatly concerned with the potential of interference from passengers' electronic devices to the communications and navigation systems used by airliners. Since this involves the issue of the basic safety of flight, the FAA has a very conservative position on this issue. This concern is enhanced by the fact that airliners operate under Instrument Flight Rules (IFR) where they are strongly dependent on the proper operation of the communication and navigation systems.

The signal strengths within the cabin will vary greatly over time. This is because the number of cell phone calls will vary greatly over the duration of each flight. At times there will be just a few calls, and at other times hundreds of calls will be in operation within the small volume of the cabin. As a result of this, the net radio frequency field strengths will vary from moment to moment. This variation plus the standing-wave aspects of radio propagation within the metal cabin suggest that at times the signal strength will be strong enough to interfere with the airplane's communication and navigation systems.

Any general use of cellular telephones on airliners must meet the important safety-of-flight standard. Before any airliners are equipped with their own cells, extensive modeling and experimenting with cell phones in airliners must be carried out. The results of this engineering work must be made available to the public before any authorization of cellular telephone use of flying airliners is allowed. Failure to do so would certainly expose the airline industry, and perhaps the cell phone providers, to liability litigation due to accidents attributed to cell phone usage.

There is a concern that FCC approval of cell phone operation will apply heavy political pressure on the FAA to also approve cell phone operation. Such pressure would be quite negative because in aviation safety must always come first.

Terrorist Use of Cell Phones

In addition, the Commission and the FAA must consider the possibility that terrorists could use cell phones to coordinate their attacks using airliners. Airborne use of cell phones would allow them to coordinate numerous simultaneous airborne attacks. Also, technically-advanced terrorists could install high power jamming equipment within innocent-looking cell phones.

Terrorist use of cell phones would allow them to coordinate several airliners to attack a single structure such as a nuclear power plant, a large hydroelectric dam, or a chemical plant.

Cell Phone Usage and the Cabin Environment.

The aircraft cabin is a crowded environment where a large number of people are in very close contact with each other. Many airline passengers, including myself, are concerned about the negative impact of cell phone use on our flying environment. In this regard, it is interesting to note the statement of Commissioner Michael J. Copps in this docket: "… many airline passengers don't relish the idea of sitting next to someone yelling into their cell phones for an entire six hour flight. I know I don't!"

For example, many people speak more loudly when they are talking on a cell phone. This is especially a problem when they are in a noisy environment. An airliner cabin is already a noisy environment and people talking loudly on their cell phones will make it even noisier. In addition, numerous cell phone ring tones will be broadcast into the cabin environment. All this suggests that cell phone usage will make flying a fairly unpleasant experience.

In the evening and at night, people want to sleep in the cabin. So the cabin pico cell will have to be shut down at night and all cell phone usage disabled. Appropriate regulations for this will have to be established by the FCC and the FAA.

The concept of a quiet cabin is an important one. For example, the AMTRAK passenger trains between New York City and Washington, D.C. have "quiet cars" where cell phone use and loud conversations are prohibited. This is a popular and valuable innovation. No-cell-phone-usage areas will need to be

established on airliners and passengers should be allowed to reserve seats in these no-cell areas.

Perhaps the Commission should encourage the use of wireless email technology instead of the use of cellular telephones. Wireless email is basically quiet in operation, and yet it allows significant amounts of communications to be carried out.

Types of Cell Phones Supported

On page 10 of the Notice of Proposed Rulemaking, the Commission asks if all handsets on board the aircraft should be controlled by the pico cell. The answer is clearly yes. Many different cell phones from many different nations will be carried on to airliners. Passengers will frequently try to use their cell phones in flight. The pico cell must be able to accommodate all of these cell phones as well as any other wireless devices, such as Blackberry wireless email units, that the passengers will attempt to use on board.

If this total control is not provided, the uncontrolled devices will cause interference problems to terrestrial cell operations.

Longer Comment Period is Needed

The thirty-day comment period for this docket is much too short. Members of the general public will not be aware of this comment period until after it has closed. Only the big business lobbyists will be aware of the opportunity to comment, and the public's valuable insights will be lost.

This problem is increased by the fact that many valuable public comments have been locked away from staff consideration by the Sunshine Period notices attached to them. Quite frankly most of the public is not aware of the nuances of the Sunshine Period and waiting until a docket has been posted in the Federal Register. The Commission should correct this problem by including all of these "premature" comments in the formal record that the staff can examine and consider.

In the future, the Commission can avoid this problem by not posting information on rule making proceedings until the formal notice has been posted in the Federal Register. This will prevent any premature comments from being filed.

Recommended Actions

The FCC, in formal cooperation with the FAA, should examine the engineering and behavioral aspects of cell phone usage in flight. The safety of flight must be protected and interference with terrestrial cellular telephone systems must be controlled. All data from these studies must be made available to the engineering community and to the public. Terrorism aspects of such cell phone use must be seriously examined as well.

Respectfully Submitted,

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